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Molecular and biochemical characterization of three anthocyanin synthetic enzymes from Gentiana triflora.

Tanaka Y, Yonekura K, Fukuchi-Mizutani M, Fukui Y, Fujiwara H, Ashikari T, Kusumi T

Plant Cell Physiol 1996 Jul **37:5** 711-6

Abstract

Full length cDNA clones of flavonoid 3',5'-hydroxylase, dihydroflavonol 4-reductase and flavonoid 3-glucosyltransferase were cloned from petals of Gentiana triflora. Their sequences were homologous to counterparts from other plants. Flavonoid 3',5'-hydroxylase and flavonoid 3-glucosyltransferase were enzymatically characterized by expressing cDNAs in heterologous expression systems.

MeSH

Alcohol Oxidoreductases, Amino Acid Sequence, **Anthocyanins**, Base Sequence, Cytochrome P-450, DNA, Complementary, DNA, Plant, Gene Expression, Glucosyltransferases, Hydroxylases, Molecular Sequence Data, **Plant Proteins**, **Plants**, Recombinant Fusion Proteins

Author Address

Institute for Fundamental Research, Suntory Ltd., Osaka, Japan.

Secondary Source (links)

GENBANK/D85184
GENBANK/D85185
GENBANK/D85186

NCBI BLAST Search Results BLAST Entrez ?

BLASTN 2.0.10 [Aug-26-1999]

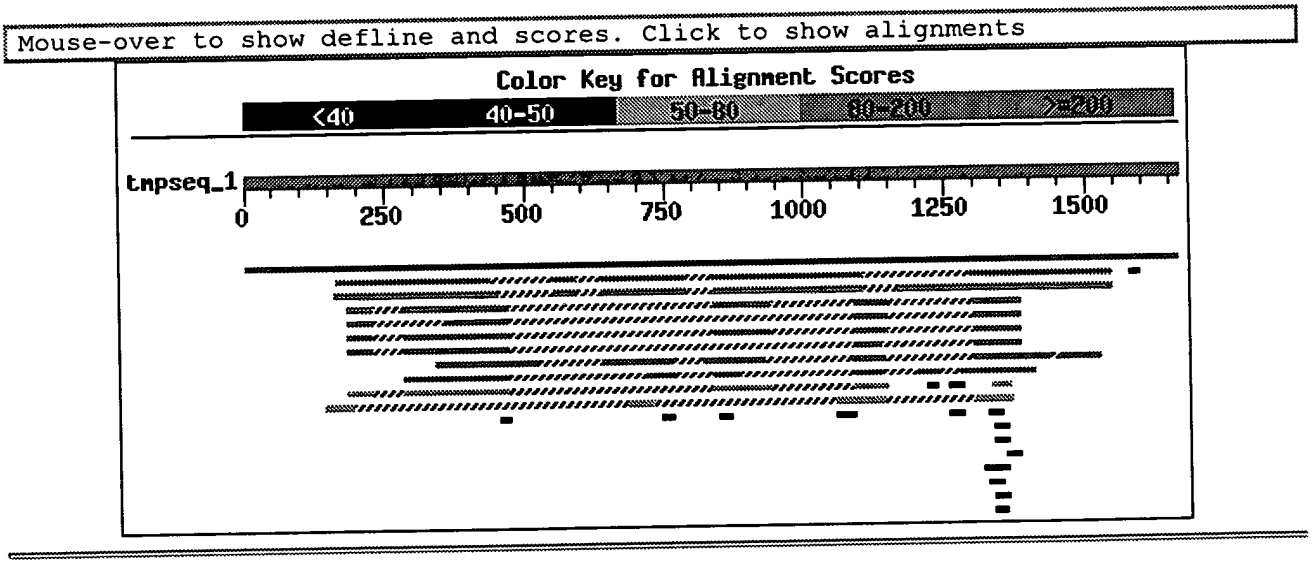
Reference:
Altschul, Stephen F., Thomas L. Madden, Alejandro A. Schäffer, Jinghui Zhang, Zheng Zhang, Webb Miller, and David J. Lipman (1997), "Gapped BLAST and PSI-BLAST: a new generation of protein database search programs", Nucleic Acids Res. 25:3389-3402.

Query=
(1666 letters)

Database: Non-redundant GenBank+EMBL+DDBJ+PDB sequences
514,787 sequences; 1,478,834,046 total letters

If you have any problems or questions with the results of this search please refer to the **BLAST FAQs**

Distribution of 66 Blast Hits on the Query Sequence



Sequences producing significant alignments:	Score (bits)	E Value
dbj|D85184|D85184 Gentiana triflora mRNA for flavonoid 3',5...	3303	0.0
gb|U72654|EGU72654 Eustoma grandiflorum flavonoid 3'5'-hydr...	155	5e-35
dbj|D14589.1|D14589 Eustoma russellianum mRNA for flavonoid...	147	1e-32
gb|AF081575|AF081575 Petunia x hybrida flavonoid 3',5'-hydr...	127	1e-26
emb|Z22545|PHFLAHYDB P.hybrida flavonoid 3',5'-hydroxylase ...	127	1e-26
dbj|D14588.1|PETHF1 Petunia hybrida Hf1 mRNA for flavonoid-...	127	1e-26
emb|Z22544|PHFLAHYDA P.hybrida flavonoid 3',5'-hydroxylase ...	111	7e-22
emb|AJ011862.1|CRO011862 Catharanthus roseus mRNA for flavo...	103	2e-19
emb|X70824|SMPEG1 S.melongena pEG1 mRNA for hydroxylase P45...	100	2e-18
emb|X71130|PHPET1 P.hybrida mRNA for P450 hydroxylase	74	1e-10
dbj|D14590|D14590 Campanula medium mRNA for flavonoid 3',5'...	72	6e-10
emb|X71658|SMCYPEG8 S.melongena CYP76A1 mRNA	52	5e-04
gb|AF022459|AF022459 Glycine max cytochrome P450 monooxygen...	46	0.032

emb|Y10098|HTCYP76B1	H.tuberosus mRNA for 7-ethoxycoumarin ...	44	0.13
emb|Y09920|HT7EC0DET	Helianthus tuberosus mRNA for 7-ethoxy...	44	0.13
emb|AJ009737|BVU9737	Beta vulgaris mRNA for eukaryotic tran...	42	0.50
gb|AC008075.2|F24J5	Arabidopsis thaliana chromosome 1 BAC F...	40	2.0
gb|AF124816.1|AF124816	Mentha x piperita cytochrome p450 is...	40	2.0
gb|AF135485.1|AF135485	Glycine max cytochrome P450 monooxyg...	40	2.0
emb|Y10490|GMC450CP3	G.max mRNA for putative cytochrome P45...	40	2.0
gb|AC003685|AC003685	Homo sapiens Xp22 BAC GS-542M4 (Genome...	40	2.0
gb|AC004114.1|AC004114	Drosophila melanogaster, chromosome ...	40	2.0
emb|AJ000751|CJAJ751	Campylobacter jejuni nifR3 gene, partial	40	2.0
gb|AF000403|AF000403	Lotus japonicus putative cytochorome P...	40	2.0
emb|Y11368|ZMCYTP450	Z.mays cyp71c4 gene	40	2.0
emb|X71657|SMCYPEG7	S.melongena CYP76A2 mRNA for hydroxylase	40	2.0
emb|X70981|SMCYPEG2	S.melongena CYP71A1 mRNA for P450 hydro...	40	2.0
emb|X81831|ZMCYP71C4	Z.mays CYP71C4 mRNA for cytochrome P-450	40	2.0

dbj|D85184|D85184 Gentiana triflora mRNA for flavonoid 3',5'-hydroxylase, complet
Length = 1666

Score = 3303 bits (1666), Expect = 0.0
Identities = 1666/1666 (100%)
Strand = Plus / Plus

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Query: 301  aaaccctcgatttaaatttctcgaaccggccaccaaatgccggagctacccatttagcct 360
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Sbjct: 361  ataacgctcaagatatggtttttgcacattatggtcctaaatggaaattgttacgtaaac 420

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Query: 601  gtcgcgtattcaataaaaaaggcgcgaaatcaaacgagtttaaagatatggtggtcgaat 660
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Sbjct: 601  gtcgcgtattcaataaaaaaggcgcgaaatcaaacgagtttaaagatatggtggtcgaat 660

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Sbjct: 781  ctcgattattggatgatcataaaagaacgagtcaggagcgtaaacaaaagcccgattttc 840

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Sbjct: 901  tcaaggctcttttattgaacttgtttactgctggtacggatacatcatcaagcatcattg 960

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Sbjct: 961  agtgggcactagcagaactgctaaagaatcggacactcctcacccgagcccaggacgaaa 1020

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Sbjct: 1021 tggatcgggtaatcgggcgagaccgccgtcttcttgaatcagacatccccaacttaccat 1080

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Sbjct: 1141 caaggaattgcatcagaggccatgtggatgtaaatgggtactacattccgaaagggactc 1200

Query: 1201 ggctcaacgtcaacatatgggcgattggaagagacccatcggtttgggggataacccga 1260
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Query: 1261 acgagttcgacccggagaggtttttgtatgggaggaatgctaagattgatccacgaggaa 1320
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                  To Be Added to Basic Index
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                  DISCOVER! 5.0 (WINDOWS ONLY)
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L3      174604 CORN

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Connection closed by remote host
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L1 186125 AROMATIC

=> s acyl

L2 117328 ACYL

=> s enzyme

L3 1448080 ENZYME

=> s l1 and l2 and l3

L4 236 L1 AND L2 AND L3

=> s plant

L5 1147055 PLANT

=> s l4 and l5

L6 9 L4 AND L5

=> d 16 1-9

L6 ANSWER 1 OF 9 BIOSIS COPYRIGHT 2000 BIOSIS
AN 1999:153961 BIOSIS
DN PREV199900153961
TI cDNA cloning, gene expression and subcellular localization of anthocyanin 5-**aromatic** acyltransferase from Gentiana triflora.
AU Fujiwara, Hiroyuki; Tanaka, Yoshikazu (1); Yonekura-Sakakibara, Keiko; Fukuchi-Mizutani, Masako; Nakao, Masahiro; Fukui, Yuko; Yamaguchi, Masaatsu; Ashikari, Toshihiko; Kusumi, Takaaki
CS (1) Inst. Fundamental Res., Suntory Ltd., Wakayamadai 1-1-1, Shimamoto-cho, Mishima-gun, Osaka 618-8503 Japan
SO Plant Journal, (Nov., 1998) Vol. 16, No. 4, pp. 421-431. ISSN: 0960-7412.
DT Article
LA English

L6 ANSWER 2 OF 9 BIOSIS COPYRIGHT 2000 BIOSIS
AN 1997:398363 BIOSIS
DN PREV199799697566
TI A gallotannin degrading esterase from leaves of pedunculate oak.
AU Niehaus, Joerg U.; Gross, Georg G. (1)
CS (1) Univ. Ulm, Abteilung Allgemeine Botanik, D-89069 Ulm Germany
SO Phytochemistry (Oxford), (1997) Vol. 45, No. 8, pp. 1555-1560. ISSN: 0031-9422.
DT Article
LA English

L6 ANSWER 3 OF 9 AGRICOLA
AN 1999:30037 AGRICOLA
DN IND21974230
TI cDNA cloning, gene expression and subcellular localization of anthocyanin 5-**aromatic** acyltransferase from Gentiana triflora.
AU Fujiwara, H.; Tanaka, Y.; Yonekura-Sakakibara, K.; Fukuchi-Mizutani, M.;

Nakao, M.; Fukui, Y.; Yamaguchi, M.; Ashikari, T.; Kusumi, T.
CS Suntory, Ltd., Osaka, Japan.
AV DNAL (QK710.P68)
SO The Plant journal : for cell and molecular biology, Nov 1998. Vol. 16, No.
4. p. 421-431
Publisher: Oxford : Blackwell Sciences Ltd.
ISSN: 0960-7412
NTE Includes references
CY England; United Kingdom
DT Article
FS Non-U.S. Imprint other than FAO
LA English

L6 ANSWER 4 OF 9 AGRICOLA
AN 1998:4890 AGRICOLA
DN IND20607818
TI A gallotannin degrading esterase from leaves of pedunculate oak.
AU Niehaus, J.U.; Gross, G.G.
CS Universitat Ulm, Ulm, Germany.
SO Phytochemistry, Aug 1997. Vol. 45, No. 8. p. 1555-1560
Publisher: Oxford : Elsevier Science Ltd.
CODEN: PYTCAS; ISSN: 0031-9422
NTE Includes references
CY England; United Kingdom
DT Article
FS Non-U.S. Imprint other than FAO
LA English

L6 ANSWER 5 OF 9 MEDLINE
AN 1999097837 MEDLINE
DN 99097837
TI cDNA cloning, gene expression and subcellular localization of anthocyanin 5-**aromatic** acyltransferase from Gentiana triflora.
AU Fujiwara H; Tanaka Y; Yonekura-Sakakibara K; Fukuchi-Mizutani M; Nakao M; Fukui Y; Yamaguchi M; Ashikari T; Kusumi T
CS Institute for Fundamental Research, Suntory Ltd, Osaka, Japan.
SO PLANT JOURNAL, (1998 Nov) 16 (4) 421-31.
Journal code: BRU. ISSN: 0960-7412.
CY ENGLAND: United Kingdom
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
OS GENBANK-AB010708
EM 199903
EW 19990305

L6 ANSWER 6 OF 9 MEDLINE
AN 1998088004 MEDLINE
DN 98088004
TI Characterization and heterologous expression of hydroxycinnamoyl/benzoyl-CoA:anthranilate N-hydroxycinnamoyl/benzoyltransferase from elicited cell cultures of carnation, Dianthus caryophyllus L.
AU Yang Q; Reinhard K; Schiltz E; Matern U
CS Institut fur Biologie II, Lehrstuhl fur Biochemie der Pflanzen, Universitat Freiburg, Germany.
SO PLANT MOLECULAR BIOLOGY, (1997 Dec) 35 (6) 777-89.
Journal code: A6O. ISSN: 0167-4412.
CY Netherlands
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
OS GENBANK-Z84383; GENBANK-Z84384; GENBANK-Z84385; GENBANK-Z84386; GENBANK-Z84571
EM 199803
EW 19980305

L6 ANSWER 7 OF 9 MEDLINE
AN 93251942 MEDLINE
DN 93251942
TI Genes for polyketide secondary metabolic pathways in microorganisms and plants.
AU Hopwood D A; Khosla C
CS John Innes Institute, John Innes Centre, Norwich, UK..
NC GM39784 (NIGMS)
SO CIBA FOUNDATION SYMPOSIUM, (1992) 171 88-106; discussion 106-12. Ref: 37
Journal code: D7X. ISSN: 0300-5208.
CY Netherlands
DT Journal; Article; (JOURNAL ARTICLE)
General Review; (REVIEW)
(REVIEW, TUTORIAL)
LA English
FS Priority Journals
EM 199308

L6 ANSWER 8 OF 9 CAPLUS COPYRIGHT 2000 ACS
AN 1999:20339 CAPLUS
DN 130:248677
TI cDNA cloning, gene expression and subcellular localization of anthocyanin 5-**aromatic** acyltransferase from Gentiana triflora
AU Fujiwara, Hiroyuki; Tanaka, Yoshikazu; Yonekura-Sakakibara, Keiko; Fukuchi-Mizutani, Masako; Nakao, Masahiro; Fukui, Yuko; Yamaguchi, Masaatsu; Ashikari, Toshihiko; Kusumi, Takaaki
CS Institute for Fundamental Research, Suntory Ltd, Osaka, 618-8503, Japan
SO Plant J. (1998), 16(4), 421-431
CODEN: PLJUED; ISSN: 0960-7412
PB Blackwell Science Ltd.
DT Journal
LA English

L6 ANSWER 9 OF 9 CAPLUS COPYRIGHT 2000 ACS
AN 1996:607581 CAPLUS
DN 125:270823
TI Cloning of cDNA for **aromatic acyl** transferase of plants for flower breeding
IN Ashikari, Toshihiko; Tanaka, Yoshikazu; Fujiwara, Hiroyuki; Nakao, Masahiro; Fukui, Yuuko; Yonekura, Keiko; Mizutani, Masako; Kusumi, Takaaki
PA Suntory Limited, Japan
SO PCT Int. Appl., 93 pp.
CODEN: PIXXD2
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9625500	A1	19960822	WO 1996-JP348	19960216
	W: AU, CA, JP, KR, NZ, SG, US				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	JP 09070290	A2	19970318	JP 1996-46534	19960130
	CA 2213082	AA	19960822	CA 1996-2213082	19960216
	AU 9646761	A1	19960904	AU 1996-46761	19960216
	AU 701065	B2	19990121		
	EP 810287	A1	19971203	EP 1996-902462	19960216
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE				

PRAI JP 1995-67159 19950217
JP 1995-196915 19950629
JP 1996-46534 19960130
WO 1996-JP348 19960216

Feb. 2. 1999

Irrelevant to this action

L11 ANSWER 1 OF 23 AGRICOLA
AN 1998:53856 AGRICOLA
DN IND20631461
TI Intron sequences are involved in the plastid- and **light-dependent** expression of the spinach PsaD gene.
AU Bolle, C.; Herrmann, R.G.; Oelmuller, R.
AV DNAL (QK710.P68)
SO The Plant journal : for cell and molecular biology, Nov 1996. Vol. 10, No. 5. p. 919-924
Publisher: Oxford : BIOS Scientific Publishers Ltd and Blackwell Sciences Ltd.
ISSN: 0960-7412
NTE Includes references
CY England; United Kingdom
DT Article
FS Non-U.S. Imprint other than FAO
LA English

L11 ANSWER 2 OF 23 AGRICOLA
AN 1998:923 AGRICOLA
DN IND20607051
TI Reduction of uroporphyrinogen decarboxylase by antisense RNA expression affects activities of other enzymes involved in tetrapyrrole biosynthesis and leads to **light-dependent** necrosis.
AU Mock, H.P.; Grimm, B.
CS Institut fur Pflanzengenetik und Kulturpflanzenforschung, Gatersleben, Germany.
SO Plant physiology, Apr 1997. Vol. 113, No. 4. p. 1101-1112
Publisher: Rockville, MD : American Society of Plant Physiologists, 1926-
CODEN: PLPHAY; ISSN: 0032-0889
NTE Includes references
CY Maryland; United States
DT Article; Conference
FS U.S. Imprints not USDA, Experiment or Extension
LA English

L11 ANSWER 3 OF 23 AGRICOLA
AN 97:66899 AGRICOLA
DN IND20589775
TI Cinnamate-4-hydroxylase expression in Arabidopsis regulation in response to development and the environment.
AU Bell-Lelong, D.A.; Cusumano, J.C.; Meyer, K.; Chapple, C.
CS Purdue University, West Lafayette, IN.
SO Plant physiology, Mar 1997. Vol. 113, No. 3. p. 729-738
Publisher: Rockville, MD : American Society of Plant Physiologists, 1926-
CODEN: PLPHAY; ISSN: 0032-0889
NTE Includes references
CY Maryland; United States
DT Article; Conference
FS U.S. Imprints not USDA, Experiment or Extension
LA English

L11 ANSWER 4 OF 23 AGRICOLA
AN 97:33503 AGRICOLA
DN IND20564409
TI Low temperature induces the accumulation of phenylalanine ammonia-lyase and chalcone synthase mRNAs of Arabidopsis thaliana in a **light-**

dependent manner.
AU Leyva, A.; Jarillo, J.A.; Salinas, J.; Martinez-Zapater, J.M.
CS Instituto Nacional de Investigacion y Tecnologia Agraria y Alimentaria, Madrid, Spain.
AV DNAL (450 P692)
SO Plant physiology, May 1995. Vol. 108, No. 1. p. 39-46
Publisher: Rockville, MD : American Society of Plant Physiologists, 1926-
CODEN: PLPHAY; ISSN: 0032-0889
NTE Includes references
CY Maryland; United States
DT Article; Conference
FS U.S. Imprints not USDA, Experiment or Extension
LA English

L11 ANSWER 5 OF 23 AGRICOLA
AN 95:67510 AGRICOLA
DN IND20487137
TI Light-responsive and transcription-enhancing elements regulate the plastid
psbD core **promoter**.
AU Allison, L.A.; Maliga, P.
CS The State University of New Jersey, Piscataway, NJ.
AV DNAL (QH506.E46)
SO The EMBO journal, Aug 1, 1995. Vol. Vol. 14, No. 15. p. 3721-3730
Publisher: Oxford, U.K. : Oxford University Press.
CODEN: EMJODG; ISSN: 0261-4189
NTE Includes references
CY England; United Kingdom
DT Article
FS Non-U.S. Imprint other than FAO
LA English

L11 ANSWER 6 OF 23 AGRICOLA
AN 95:13290 AGRICOLA
DN IND20445219
TI Two distinct cis-acting elements are involved in **light-dependent** activation of the pea elip **promoter**.
AU Blecken, J.; Weisshaar, B.; Herzfeld, F.
CS Institut fur Botanik der Universitat Hannover, Hannover, Germany
AV DNAL (442.8 Z34)
SO Molecular & general genetics : MGG, Nov 1, 1994. Vol. 245, No. 3. p. 371-379
Publisher: Berlin, Germany : Springer Produktions-Gesellschaft.
CODEN: MGGEAE; ISSN: 0026-8925
NTE Includes references
CY Germany
DT Article
FS Non-U.S. Imprint other than FAO
LA English

L11 ANSWER 7 OF 23 AGRICOLA
AN 92:54828 AGRICOLA
DN IND92029990
TI Overexpression of phytochrome B induces a short hypoctyl phenotype in **transgenic** arabidopsis.
AU Wagner, D.; Tepperman, J.M.; Quail, P.H.
CS University of California, Berkeley, CA
AV DNAL (QK725.P532)
SO The Plant cell, Dec 1991. Vol. 3, No. 12. p. 1275-1288
Publisher: Rockville, Md. : American Society of Plant Physiologists.
ISSN: 1040-4651
NTE Includes references.
DT Article
FS U.S. Imprints not USDA, Experiment or Extension
LA English

L11 ANSWER 8 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1997:265664 CAPLUS
DN 126:328101
TI Reduction of uroporphyrinogen decarboxylase by antisense RNA expression affects activities of other enzymes involved in tetrapyrrole biosynthesis and leads to **light-dependent** necrosis
AU Mock, Hans-Peter; Grimm, Bernhard
CS Institut Pflanzengenetik Kulturpflanzenforschung, Gatersleben, D-06466, Germany
SO Plant Physiol. (1997), 113(4), 1101-1112
CODEN: PLPHAY; ISSN: 0032-0889
PB American Society of Plant Physiologists
DT Journal
LA English

L11 ANSWER 9 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1997:190125 CAPLUS
DN 126:290689
TI Cinnamate-4-hydroxylase expression in Arabidopsis. Regulation in response to development and the environment
AU Bell-Lelong, Dolly A.; Cusumano, Joanne C.; Meyer, Knut; Chapple, Clint
CS Department of Biochemistry, Purdue University, West Lafayette, IN, 47907, USA
SO Plant Physiol. (1997), 113(3), 729-738
CODEN: PLPHAY; ISSN: 0032-0889
PB American Society of Plant Physiologists
DT Journal
LA English

L11 ANSWER 10 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1997:1442 CAPLUS
DN 126:43527
TI Intron sequences are involved in the plastid- and **light-dependent** expression of the spinach PsaD gene
AU Bolle, Cordelia; Herrmann, Reinhold G.; Oelmueller, Ralf
CS Botanisches Institut, Ludwig-Maximilians-Universitaet, Munich, 80638, Germany
SO Plant J. (1996), 10(5), 919-924
CODEN: PLJUED; ISSN: 0960-7412
PB Blackwell
DT Journal
LA English

L11 ANSWER 11 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1996:734852 CAPLUS
DN 126:27612
TI Evidence that the plastid signal and light operate via the same cis-acting elements in the promoters of nuclear genes for plastid proteins
AU Kusnetsov, Victor; Bolle, Cordelia; Luebberstedt, Thomas; Sopory, Sudhir; Herrmann, Reinhold G.; Oelmueller, Ralf
CS Botanisches Institut, Ludwig-Maximilians-Universitaet, Munich, D-80638, Germany
SO Mol. Gen. Genet. (1996), 252(6), 631-639
CODEN: MGGEAE; ISSN: 0026-8925
PB Springer
DT Journal
LA English

L11 ANSWER 12 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1995:567198 CAPLUS
DN 122:310830
TI Low temperature induces the accumulation of phenylalanine ammonia-lyase and chalcone synthase mRNAs of Arabidopsis thaliana in a **light-**

dependent manner
AU Leyva, Antonio; Jarillo, Jose Antonio; Salinas, Julio; Martine-Zapater, Jose Miguel
CS Dep. Biologia Molecular Virologia Vegetal, Inst. Nacional Investigacion Tecnologia Agraria Alimentaria, Mardis, 28040, Spain
SO Plant Physiol. (1995), 108(1), 39-46
CODEN: PLPHAY; ISSN: 0032-0889
DT Journal
LA English

L11 ANSWER 13 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1995:394210 CAPLUS
DN 122:283734
TI Two distinct cis-acting elements are involved in **light-dependent** activation of the pea elip **promoter**
AU Blecken, Jens; Weisshaar, Bernd; Herzfeld, Frank
CS Inst. Botanik, Univ. Hannover, Hannover, 30419, Germany
SO Mol. Gen. Genet. (1994), 245(3), 371-9
CODEN: MGGEAE; ISSN: 0026-8925
DT Journal
LA English

L11 ANSWER 14 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1993:666574 CAPLUS
DN 119:266574
TI Light-regulated expression of the Arabidopsis thaliana ferredoxin A gene involves both transcriptional and post-transcriptional processes
AU Vorst, Oscar; van Dam, Frans; Weisbeek, Peter; Smeekens, Sjef
CS Dep. Mol. Cell Biol., Univ. Utrecht, Utrecht, 3584 CH, Neth.
SO Plant J. (1993), 3(6), 793-803
CODEN: PLJUED; ISSN: 0960-7412
DT Journal
LA English

L11 ANSWER 15 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1993:642538 CAPLUS
DN 119:242538
TI **Promoter** analysis of a light-regulated gene encoding hydroxypyruvate reductase, an enzyme of the photorespiratory glycolate pathway
AU Sloan, James S.; Schwartz, Brian W.; Becker, Wayne M.
CS Dep. Genet., Univ. Wisconsin, Madison, WI, 53706, USA
SO Plant J. (1993), 3(6), 867-74
CODEN: PLJUED; ISSN: 0960-7412
DT Journal
LA English

L11 ANSWER 16 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1993:249032 CAPLUS
DN 118:249032
TI Characterization of the **promoter** from the single-copy gene encoding ferredoxin-NADP+-oxidoreductase from spinach
AU Oelmueller, R.; Bolle, C.; Tyagi, A. K.; Niekrawietz, N.; Breit, S.; Herrmann, R. G.
CS Bot. Inst., Ludwig-Maximilians-Univ., Munich, W-8000/19, Germany
SO Mol. Gen. Genet. (1993), 237(1-2), 261-72
CODEN: MGGEAE; ISSN: 0026-8925
DT Journal
LA English

L11 ANSWER 17 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1992:167780 CAPLUS
DN 116:167780
TI Tissue-specific activity and **light-dependent** regulation of a soybean rbcS **promoter** in **transgenic**

tobacco plants monitored with the firefly luciferase gene
AU Quandt, H. J.; Broer, I.; Puehler, A.
CS Fak. Biol., Univ. Bielefeld, Bielefeld, D-4800/1, Germany
SO Plant Sci. (Limerick, Irel.) (1992), 82(1), 59-70
CODEN: PLSCE4; ISSN: 0168-9452
DT Journal
LA English

L11 ANSWER 18 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1992:167682 CAPLUS
DN 116:167682
TI Unusual features of the light response system regulating ferredoxin gene expression
AU Thompson, W. F.; Elliott, R. C.; Dickey, L. F.; Gallo, M.; Pedersen, T. J.; Sowinski, D. A.
CS Dep. Bot., North Carolina State Univ., Raleigh, NC, 27695, USA
SO NATO ASI Ser., Ser. H (1991), 50(Phytochrome Prop. Biol. Action), 201-16
CODEN: NASBE4; ISSN: 1010-8793
DT Journal
LA English

L11 ANSWER 19 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1992:102785 CAPLUS
DN 116:102785
TI Overexpression of phytochrome B induces a short hypocotyl phenotype in **transgenic** Arabidopsis
AU Wagner, Doris; Tepperman, James M.; Quail, Peter H.
CS Dep. Plant Biol., Univ. California, Berkeley, CA, 94720, USA
SO Plant Cell (1991), 3(12), 1275-88
CODEN: PLCEEW; ISSN: 1040-4651
DT Journal
LA English

L11 ANSWER 20 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1990:510450 CAPLUS
DN 113:110450
TI Minimal sequence requirements for the regulated expression of rbcS-3A from
Pisum sativum in **transgenic** tobacco plants
AU Cuozzo-Davis, Maria; Yong, Mun Heng; Gilmartin, Philip M.; Goyvaerts, Elisabeth; Kuhlemeier, Cris; Sarokin, Laura; Chua, Nam Hai
CS Lab. Plant Mol. Biol., Rockefeller Univ., New York, NY, 10021-6399, USA
SO Photochem. Photobiol. (1990), 52(1), 43-50
CODEN: PHCBAP; ISSN: 0031-8655
DT Journal
LA English

L11 ANSWER 21 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1990:435683 CAPLUS
DN 113:35683
TI GT-1 binding site confers light responsive expression in **transgenic** tobacco
AU Lam, Eric; Chua, Nam Hai
CS Lab. Plant Mol. Biol., Rockefeller Univ., New York, NY, 10021, USA
SO Science (Washington, D. C., 1883-) (1990), 248(4954), 471-4
CODEN: SCIEAS; ISSN: 0036-8075
DT Journal
LA English

L11 ANSWER 22 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1990:1903 CAPLUS
DN 112:1903
TI cis-Acting elements for light regulation of pea ferredoxin I gene expression are located within transcribed sequences
AU Elliott, Robert C.; Dickey, Lynn F.; White, Michael J.; Thompson, William

Quandt et al.
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F.
CS Dep. Bot., North Carolina State Univ., Raleigh, NC, 27695, USA
SO Plant Cell (1989), 1(7), 691-8
CODEN: PLCEEW; ISSN: 1040-4651
DT Journal
LA English

L11 ANSWER 23 OF 23 CAPLUS COPYRIGHT 1999 ACS
AN 1989:109305 CAPLUS
DN 110:109305
TI Dissection of 5' upstream sequences for selective expression of the Nicotiana plumbaginifolia rbcS-8B gene
AU Poulsen, Carsten; Chua, Nam Hai
CS Lab. Plant Mol. Biol., Rockefeller Univ., New York, NY, 10021-6399, USA
SO MGG, Mol. Gen. Genet. (1988), 214(1), 16-23
CODEN: MGGEAE; ISSN: 0026-8925
DT Journal
LA English

=> d l11 1 4 5 6 21 17 abs

L11 ANSWER 1 OF 23 AGRICOLA
AB Plastid- and light-regulated expression of the spinach PsaD gene in **transgenic** tobacco requires sequences down-stream of the transcription start site, and **promoter** sequences alone are not sufficient to respond to these stimuli. The spinach PsaD mRNA level in **transgenic** tobacco is still plastid- and light-responsive when the expression of the intron-containing transcription unit is driven by the 35S RNA CaMV **promoter** indicating that PsaD contains (a) gene-internal control element(s). If the genomic PsaD sequence in the latter construct was replaced by the cDNA, a constitutive expression of the PsaD transcript level was observed. It is concluded that the intron sequence contributes to the plastid- and **light-dependent** expression of the spinach PsaD gene.

L11 ANSWER 4 OF 23 AGRICOLA
AB Anthocyanins, which accumulate in leaves and stems in response to low temperature and changes in light intensity, are synthesized through the phenylpropanoid pathway that is controlled by key enzymes that include phenylalanine ammonia-lyase (PAL) and chalcone synthase (CHS). In this work we demonstrate that PAL and CHS mRNAs accumulate in leaves of Arabidopsis thaliana (L.) Heynh. upon exposure to low temperature in a **light-dependent** manner. The regulation of the PAL1 gene expression by low temperature and light was examined by analyzing the expression of the beta-glucuronidase (uidA) reporter gene in **transgenic** Arabidopsis plants containing the uidA gene of Escherichia coli under the control of the PAL1 **promoter**. The results indicate that the accumulation of PAL1 mRNA is transcriptionally regulated. Histochemical staining for beta-glucuronidase activity showed that the PAL1 **promoter** is preferentially activated in photosynthetically active cells, paralleling anthocyanin accumulation. Moreover, we show that light may also be implicated in the regulation of the CHS gene in response to bacterial infiltration. Finally, using two transparent testa Arabidopsis mutants that are unable to accumulate anthocyanins, we demonstrate that these pigments are not required for successful development of freezing tolerance in this species.

L11 ANSWER 5 OF 23 AGRICOLA
AB The psbD operon of higher **plant** plastids is regulated transcriptionally through the activity of an upstream light-responsive **promoter**. To identify **promoter** elements important for the regulation, portions of the tobacco psbD 5' region were fused to the reporter gene, uidA, and were introduced into the tobacco plastid genome by targeted gene insertion. Examination of uidA mRNA accumulation in

dark-adapted and light-treated transplastomic plants revealed that a 107 bp segment of psbD 5' sequence was sufficient to promote light-responsive expression of the reporter gene in vivo. The 107 bp **promoter** region contains three pairs of short, repeated sequences upstream of the core **promoter** -10/-35 elements. Deletion of the upstream-most A-rich sequences resulted in a 5-fold decrease in reporter gene mRNA accumulation, but did not affect the light response. Additional removal of the second and third repeated elements further reduced the **promoter** strength approximately 30-fold and almost eliminated the **light-dependent** accumulation of uidA transcripts. These data indicate that the architecture of chloroplast promoters is more complex than previously assumed, and may comprise general enhancer and regulatory elements in addition to the core **promoter** motifs. Transcriptional regulation of psbD may be mediated by the chloroplast proteins which were shown to interact with the repeated sequences.

L11 ANSWER 6 OF 23 AGRICOLA

AB Light activation of the pea (Pisum sativum) elip gene **promoter** was analysed in **transgenic** plants and in transiently transfected **plant** protoplasts. A series of **promoter** deletions fused to the gusA reporter was tested, and the results obtained by the two experimental approaches were in good agreement. We identified two nucleotide sequence elements involved in light-regulated expression of the elip gene. One element is similar to the GTI binding site of the rbcS-3A gene, and the other resembles a G-box-like ACGT element. The region containing both elements was able to confer light responsiveness on a heterologous basic **promoter**. Electrophoretic mobility shift assays demonstrated that each element is specifically recognized by DNA-binding proteins present in nuclear extracts from pea seedlings. The G-box-like ACGT element is necessary but not sufficient for light inducibility, indicating that the two elements act together in conferring light responsiveness.

L11 ANSWER 21 OF 23 CAPLUS COPYRIGHT 1999 ACS

AB **Light-dependent** expression of rbcS, the gene encoding the small subunit of ribulose-1,5-bisphosphate carboxylase, which is the key enzyme involved in carbon fixation in higher plants, is regulated at the transcriptional level. Sequence anal. of the gene has uncovered a conserved GT motif in the -150 to -100 region of many rbcS promoters. This motif serves as the binding site of a nuclear factor, designated GT-1. Anal. of site-specific mutants of pea rbcS-3A **promoter** demonstrated that GT-1 binding in vitro is correlated with light-responsive expression of the rbcS **promoter** in **transgenic** plants. However, it is not known whether factors other than GT-1 might also be required for activation of transcription by light. A synthetic tetramer of box II (TGTGTGGTTAATATG), the GT-1 binding site located between -152 to -138 of the rbcS-3A **promoter**, inserted upstream of a truncated cauliflower mosaic virus 35S **promoter** is sufficient to confer expression in leaves of **transgenic** tobacco. This expression occurs principally in chloroplast-contg. cells, is induced by light, and is correlated with the ability of box II to bind GT-1 in vitro. The data show that the binding site for GT-1 is likely to be a part of the mol. light switch for rbcS activation.

L11 ANSWER 17 OF 23 CAPLUS COPYRIGHT 1999 ACS

AB The spacial and temporal **promoter** activity of the soybean rbcS gene SRS1 in **transgenic** tobacco plants was investigated. A 5'-fragment of the gene was fused to the coding region of the North American firefly luciferase (luc), to function as a reporter gene. The hybrid gene was introduced into Nicotiana tabacum by Agrobacterium-mediated leaf disk transformation and **transgenic** plants were

regenerated. In planta and in vitro luciferase assays demonstrated that the activity of the soybean rbcS **promoter** in the heterologous tobacco background not only remained organ-specific, but was also stimulated by light. This is the first report demonstrating the suitability of the firefly luciferase reporter gene to investigate the temporal expression pattern of an environmentally-stimulated **plant**